A. BALL.

COAL OR STONE DRILLING MACHINE.

APPLICATION FILED JAN. 14, 1904.

920,007.

Patented Apr. 27, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

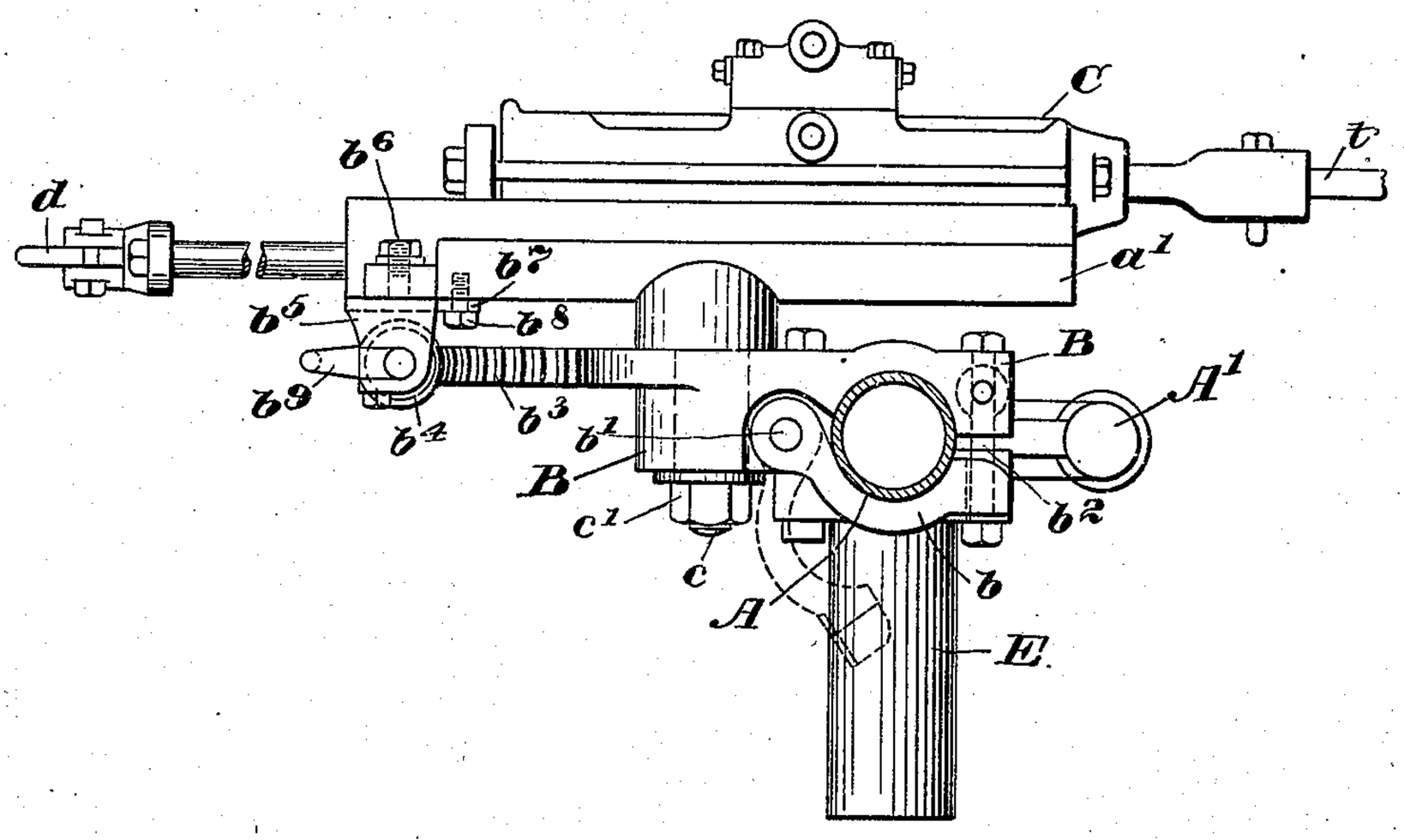

Fig. 2.

Witnesses:

Horace A. Crossman.

Everett L. Emery

Inventor.

Albert Ball.

by Emery, Booth & Powell

Atty's.

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3 SHEETS—SHEET 2.

Fig. 3.

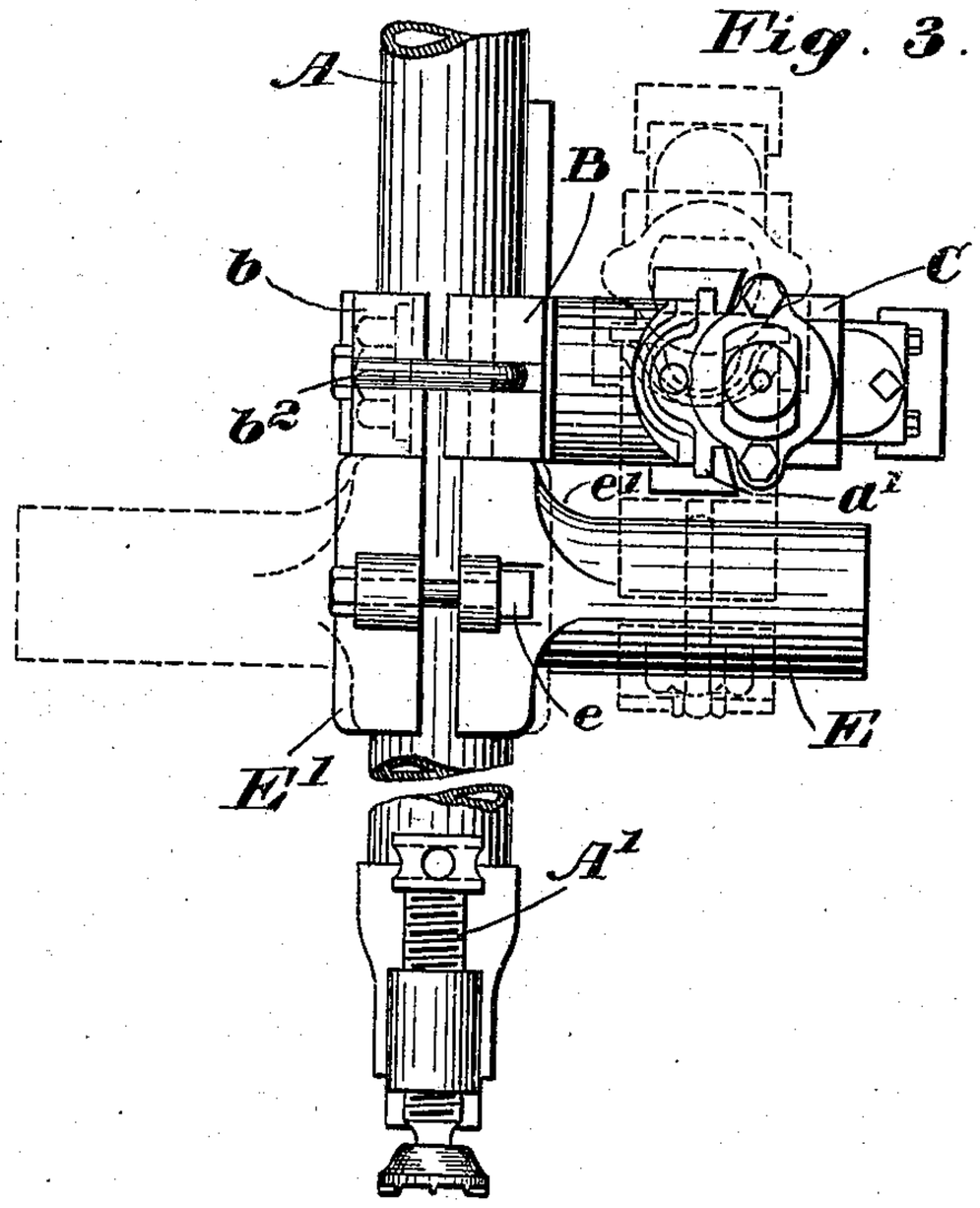
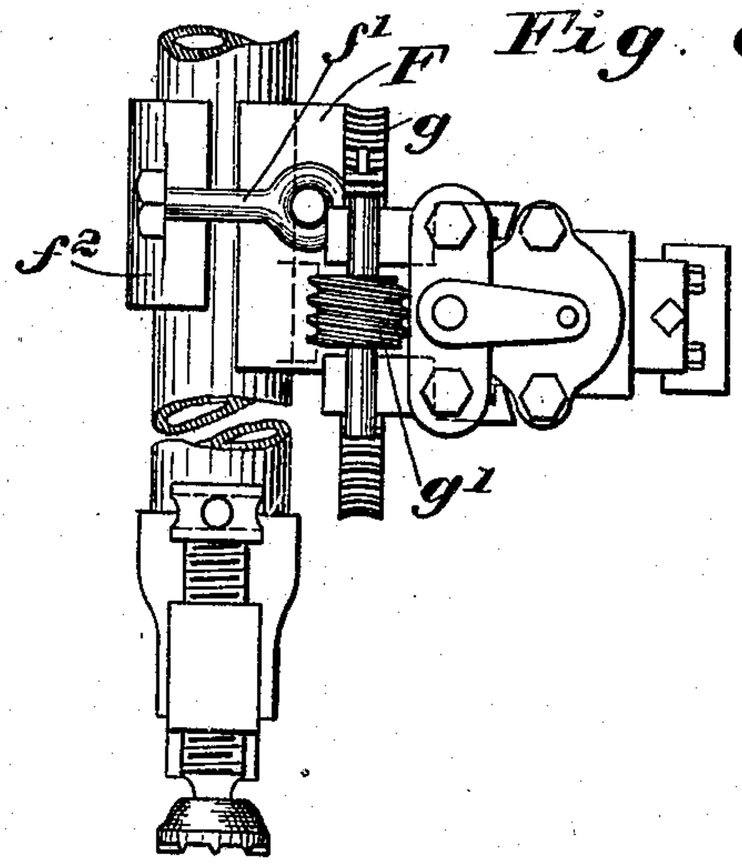


Fig. 6.



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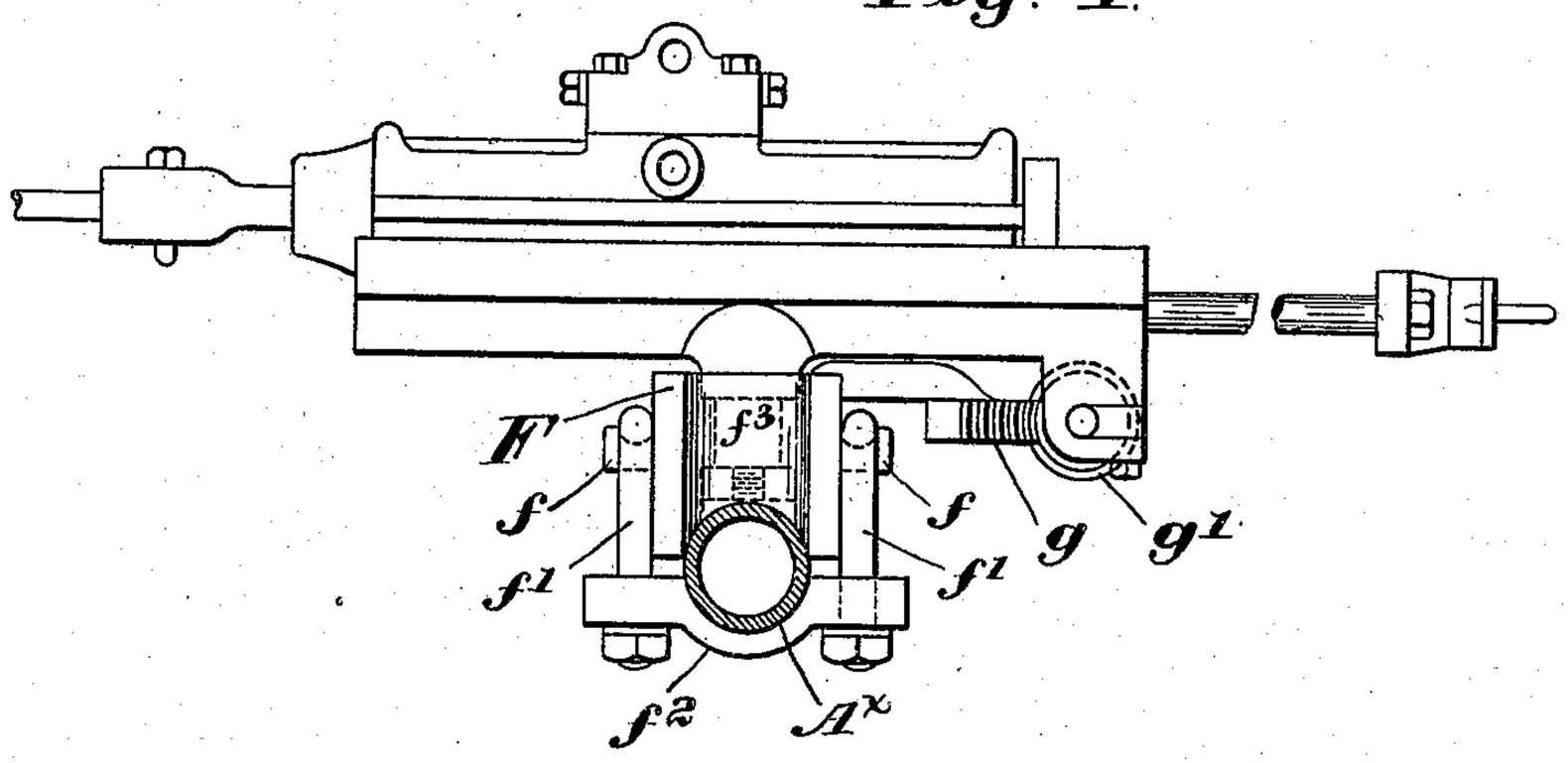
3 SHEETS—SHEET 3.

Fig. 4.



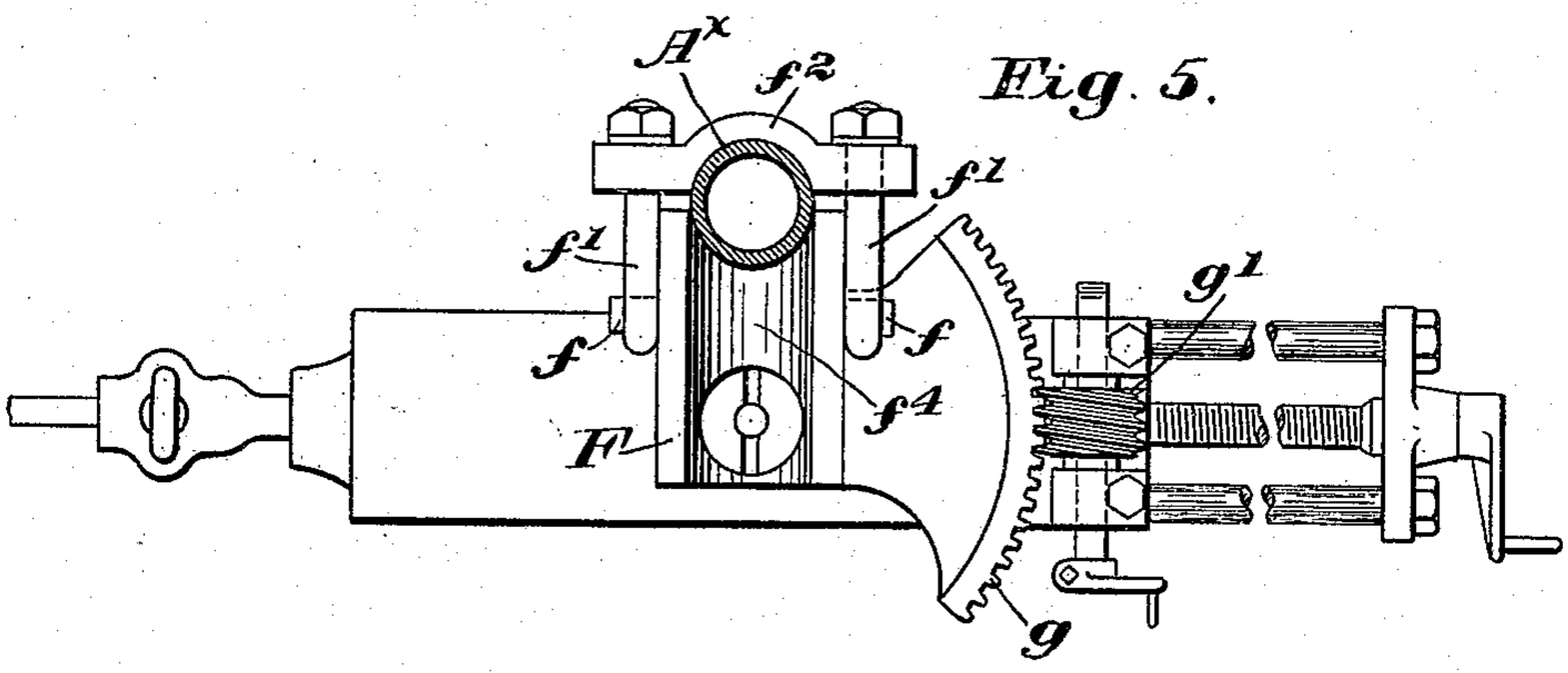


Fig. 5.

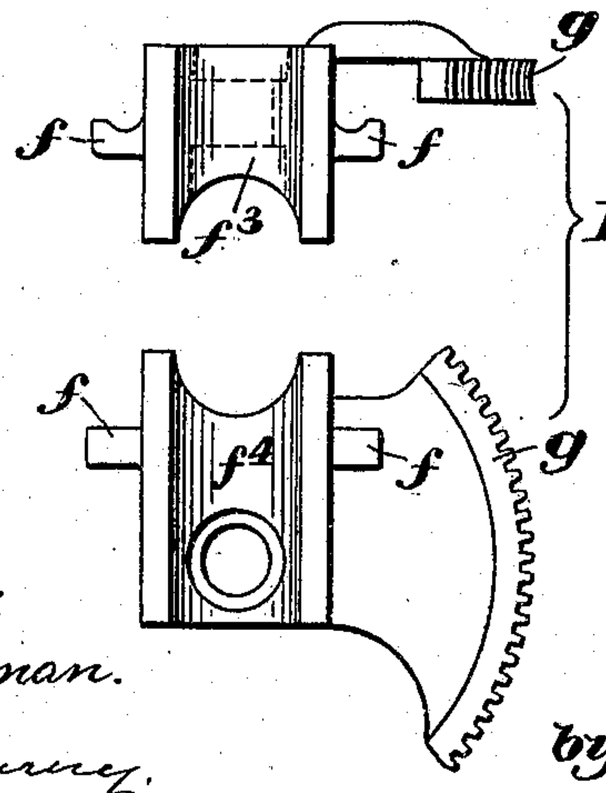


Fig. 7.

Witnesses:

Horace A. Crossman.

Everett L. Emery.

Inventor:

Albert Ball.

by Emery, Booth Powell

Attys.

UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, OF CLAREMONT, NEW HAMPSHIRE, A CORPORATION OF MAINE.

COAL OR STONE DRILLING MACHINE.

No. 920,007. Specification of Letters Patent. Patented April 27, 1909.

Application filed January 14, 1904. Serial No. 188,965.

To all whom it may concern:

Be it known that I, ALBERT BALL, a citizen of the United States, and a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented an Improvement in Coal or Stone Drilling Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention aims to improve coal or stone drilling machines, whereby the same may be conveniently adapted either for vertical or shear cutting and for horizontal or undercutting, as occasion may require.

The various features of my invention will best be understood from a description of one or more specific embodiments thereof; it being understood, of course, that my invention is not to be limited to the particular embodiments here selected for disclosure.

In the drawings,—Figure 1, in top view, shows a coal or stone drilling machine mounted for vertical or shear cutting; Fig. 2 is a side view of the machine shown in Fig. 1; Fig. 3 is a view looking from the right, Fig. 1; Fig. 4, a top view illustrating a modified embodiment of my invention; Fig. 5, a side view of Fig. 4, with the upright in a different position; Fig. 6, a view looking from the right, Fig. 4, and Fig. 7, details relating to the construction of Figs. 4 to 6, inclusive, and to be hereinafter referred to.

Referring first to the specific embodiment of my invention illustrated in Figs. 1 to 3, inclusive, the upright column or support, shown in Fig. 2 and marked "A", is adapted to be fixed in position,—as, for instance, by wedging it between the top and bottom walls of a drift; it being provided at its lower end with jackscrews, A′, for the purpose. Upon this upright supporting column A, is clamped at the proper level a saddle, B, shown best in Fig. 1, said saddle having a cap, *b*, hinged to it at *b′* and having its free end notched to receive the clamping eye-bolt, b^2, by which the column may be clamped or gripped between the saddle and said cap for the support of the drilling machine in desired position. The drilling machine C, shown as in the form of the usual pneumatic or steam drill, has its shell provided with a trunnion, *c*, which has a bearing in the saddle, B, and is secured therein by a nut, *c′*, whereby the drilling machine may be swung about its said trunnion for varying the angle of its cut. Cast upon or otherwise secured to the saddle B is a toothed quadrant, b^3, the same meshing with a worm, b^4, mounted in a swing plate, b^5, pivoted at b^6, to the drilling machine shell. At its lower end the swing plate is provided with an arc-shaped, slotted ear, b^7, which receives a clamping bolt, b^8, on the machine shell. By slackening this clamping bolt, b^8, the worm may be swung out of engagement with the quadrant, b^3, when necessary, or may be adjusted into better contact with the teeth of the quadrant, to take up wear. The worm may be rotated in suitable manner, as by a handle, b^9.

As shown in the drawings, Figs. 1 and 2, the drilling machine when in operation, may be swept in a vertical plane by means of the worm and quadrant described, to cause the cutting tool, *t*, to make a vertical or shear cut in a wall to which it is presented and the position of this vertical plane may be varied as desired by turning the saddle more or less about its vertical supporting column, A. The cutting tool, *t*, may be advanced or fed to the work in suitable manner, as by usual means, typified at *d*. Immediately below the saddle, B, as shown in Figs. 1 and 2, and constituting a support for said saddle, is a laterally extended supporting arm, E; the same at its inner end being fitted to embrace substantially one-half the vertical column, A, and having opposed to it a clamping cap, E′, Fig. 3, fitted to said column; the latter being clamped tightly between the two by suitable means, as the bolts, *e*. This laterally extended support or arm E during vertical or shear cutting, may be turned outwardly as in Figs. 1 and 2, thereby to leave a perfectly free field for swinging the drilling machine vertically. When, however, it is desired to employ the drilling machine for horizontal or undercutting, the cap E′ is slackened sufficiently and the arm E is swung around through, say one hundred and eighty degrees into desired position, as shown in full lines, Fig. 3, and is again clamped. The saddle cap bolt, b^2, is now slackened and turned to one side and the cap itself swung back past its dotted position, Fig. 1, to permit the saddle, carrying the drilling machine, to be swung down into dotted position, Fig. 3, with said saddle resting upon the supporting arm E. The saddle cap is now swung into

clamping position to embrace said arm and there clamped; leaving the drilling machine now supported upon the horizontal arm and adapted to be swept through a horizontal or approximately horizontal plane by the same worm and quadrant as before, for the purpose of undercutting. To enable the saddle to be conveniently swung from its vertical support, and vice versa as occasion may require, I have provided the said arm, E, with a round guiding surface or fillet, e', Fig. 3, which maintains control of the saddle and its machine during the shifting operation and prevents any liability of its falling or being otherwise injured. This arm E likewise may be swung into different angular positions, according to the desired direction in which the undercutting is to take place. I regard the laterally extended arm E essentially as a part of the upright column, A, since they might, if desired, be cast or formed in a single integral structure. It is convenient, however, to have this arm constructed to swing or move relatively to the upright portion A.

Turning now to Figs. 4 to 7, inclusive, the upright column is there marked $A^{\times}$, and the saddle to which the drilling machine, is swiveled or trunnioned, is marked F. This saddle in this modified construction, has two of its faces, herein positioned at an angle of ninety degrees one relative to the other, each concaved or formed to embrace substantially one half of this supporting column. At its sides this saddle is provided with trunnion pins, f, which are embraced by eye-bolts, f', that engage the cap f^2, by means of which the saddle may be clamped tightly to the column in desired rotative or horizontal position. When clamped with its concave surface f^4, Figs. 4 and 7, against the column, the drilling machine trunnion permits said machine to be swept through a vertical plane for shearing, but by slackening on the eye-bolts f' and releasing the cap f^2, the saddle F may be tipped into vertical position, with its concave surface f^3 against the column as indicated in Fig. 5, so that the drilling machine trunnion will be positioned for sweeping the drilling machine horizontally for undercutting purposes. Whatever be the position of the saddle, whether for shearing or undercutting, the same quadrant g and worm g' maintain control of the drilling machine and enable it to be swept in the desired plane. It is thus in a way immaterial whether the supporting column, as in Figs. 1, 2, and 3, be provided with the differently positioned surfaces, or whether, as in Figs. 4 to 7, inclusive, the saddle be provided with these surfaces; for in either case, one or the other,—that is, the support or the saddle,—is provided with a plurality of differently positioned surfaces which, when utilized, respectively position the drilling machine for shearing or undercutting, or other desired purpose, according to the nature and position of the particular supporting surface utilized. In every case the particular supporting surface employed coöperates with the quadrant and worm in controlling the movements of the cutting tool for producing the desired cut.

Obviously, any desired type or construction of rock drilling machine may be employed.

Having described two embodiments of my invention and without limiting myself thereto, what I claim and desire to secure by Letters Patent is,—

1. The combination with a rock drilling machine of a supporting column therefor provided with a laterally extended arm, and a curved guiding surface in the angle between said column and arm to engage with an appropriate surface upon the machine and guide the same from said column to said arm, and vice versa, and means operative in either position of said machine to impart cutting movement thereto along a given plane according to the position of said machine.

2. In a rock drilling machine the combination with a support therefor, a quadrant and an engaging worm carried by the machine to vary the cutting angle of the drill while the machine is secured to said support, said worm being swingingly mounted for withdrawal from engagement with the quadrant.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

ALBERT BALL.

Witnesses:
FRANK A. BALL,
LEE A. KNIGHTS.